

Title Non-destructive measurement of acidity, soluble solids and firmness of Satsuma mandarin using Vis/NIR-spectroscopy techniques

Author Antihus Hernández Gómez, Yong He and Annia García Pereira

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### Abstract

Visible/near-infrared spectroscopy (Vis/NIRS) appears as a prominent technique for non-destructive fruit quality assessment. This research work was focused in to evaluate the use of Vis/NIRS in measuring the quality characteristics of intact Satsuma mandarin “Zaojin Jiaogan” (*C. reticulata*), and to establish the relationship between non-destructive Vis/NIR spectral measurements and the major physiological properties of fruit (firmness, soluble solids content (SSC) and acidity (pH)). Before calibration, two types of data pre-processing were used and NIR models were developed based on partial least square (PLS) and principal component regression (PCR) techniques. The prediction models indicated that a reasonable to excellent prediction performance could be expected for each property. The best SSC model had a mean square error of prediction (RMSEP) of 0.33 °Brix and correlation coefficient between predicted and measured values ( $r$ ) of 0.94, the proposed model for the pH and the compression force had a RMSEP of 0.18 and 8.53, as well as,  $r$  of 0.8 and 0.83, respectively. It was concluded that by using the Vis/NIRS measurement technique, in the full spectral range (400–2350 nm), it is possible to assess the quality characteristics of mandarin.